Trend Study 16C-15-99

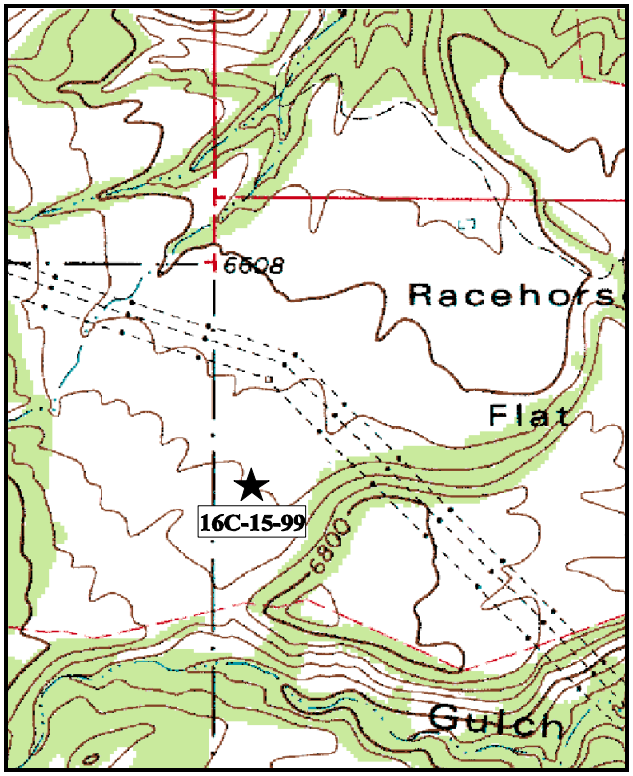
Study site name: Howard FS Chaining . Range type: Chained, Seeded P-J .

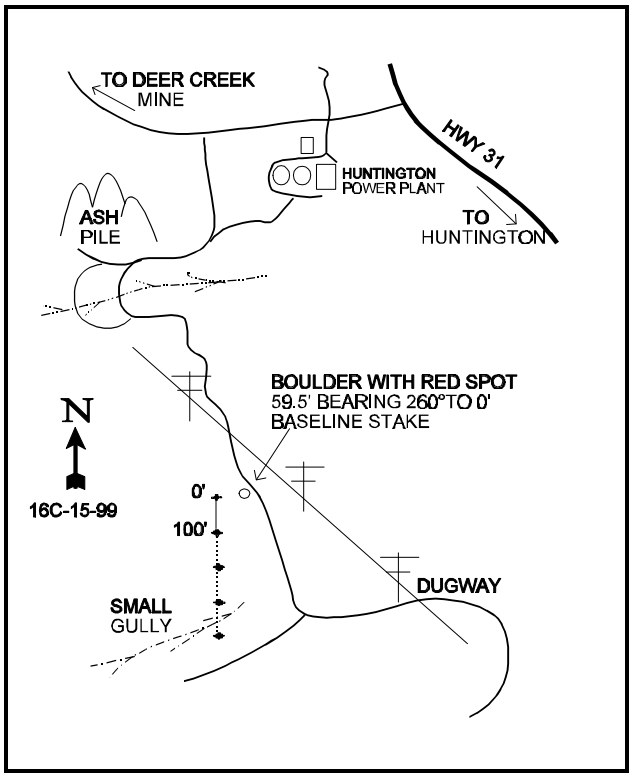
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

The shortest route to reach this study area is through the Huntington Power Plant. From the main building, go through the plant to the SE gate. Continue on the paved road 0.85 miles to a fork. The plant's ash pile is on the right. Bear left to a bridge or continue around the head of a small draw, following the road southeast towards the powerline. About 0.15 miles from the bridge there is an old fence. Go 0.1 miles to another fence. Continue up through the chaining, past the powerlines, for 0.25 miles to a large white rock with a red-painted spot, on the right side of the road. From the rock, walk 60 feet west to the first baseline stake. The fencepost is marked with browse tag #7881. The other study stakes run south at 100 foot intervals.





Map Name: Red Point

Diagrammatic Sketch

Township 17S , Range 8E , Section 7

UTM 4356668.380 N, 493455.281 E

DISCUSSION

Trend Study No. 16C-15 (31-13)

Located on the BLM side of the fence on Racehorse Flat, by an area known as the Howard-Forest Service Chaining, this study site samples a pinyon-juniper/black sagebrush range site that was chained and seeded in the early 1970's. A variety of browse were seeded, including a palatable ecotype of basin big sagebrush. Like the previous study, it is in the West Huntington Cattle Allotment where reductions have been made in spring cattle grazing. This chaining appears to receive light use by cattle with abundant sign of deer winter use. Pellet group data from 1999 estimate 42 deer, 1 elk and 15 cow days use/acre (104 ddu/ha, 3 edu/ha, 37 cdu/ha). There was also some old sheep sign. A small percentage of the cow pats were fresh but most appeared to be from last season.

The study site has a northwest aspect with a 3-5% slope and an elevation of 6,650 feet. The soil is relatively shallow and very rocky with a high percentage of boulders on the surface and below. Effective rooting depth is estimated at 13 inches. Soil texture is a sandy clay loam with a slightly alkaline pH (7.6). Phosphorus levels are marginal at 6.3 ppm. Values less than 10 ppm can limit normal plant growth and development. There are areas of pavement concentration and small gullies, but abundant chaining debris and fair grass cover provide protection from serious soil loss.

The key browse species on the flat consist of a mixture of basin big sagebrush, black sagebrush, and Wyoming big sagebrush. There is apparently some hybridizing occurring between the Wyoming big sagebrush and the lower growing black sagebrush. All sagebrush species individually show evidence of moderate and some heavy use. The mature basin big sagebrush were tall, with good vigor, although there were few young or seedlings. Black sagebrush population also contains few seedling or young plants. Wyoming big sagebrush is the most common shrub on the site. It was identified as basin big sagebrush in 1988. Overall sagebrush density has decreased since 1988, due to a major decline in the number of young plants. Drought conditions combined with increasing competition with pinyon and juniper trees probably caused this mortality.

Pinyon and juniper appear to be decreasing slightly on the site with point-center quarter data from 1994 estimating 445 trees/acre, with 23% pinyon and 77% juniper. Data from 1999 estimate 411 trees/acre. Density of juniper is estimated at 321 trees/acre with an average diameter of 2.1 inches. Pinyon number 90 trees/acre with an average diameter of 5 inches. Pinyon is around 10 feet in height while juniper averages around 6 feet. Neither species is producing many cones.

Other, less abundant preferred browse found on the site include, white rubber rabbitbrush, four-wing saltbush, and true mountain mahogany. True mountain mahogany is mostly unavailable, moderately to heavily used, and in poor vigor. White rubber rabbitbrush is fairly abundant but appears to be declining. It currently (‘99) displays moderate to heavy use and declining recruitment, poor vigor, and increasing decadency.

The herbaceous understory is poor and produces less than 6% cover. The seeded crested wheatgrass is the only abundant herbaceous species on the site. It provided 96% of the grass cover and 82% of the herbaceous cover in 1994. By 1999, crested wheatgrass accounted for 92% of the grass cover and 84% of the total herbaceous cover. Intermediate wheatgrass, smooth brome, Indian ricegrass, bottlebrush squirreltail, and Russian wildrye were all encountered in 1988, however only Russian wildrye and few Indian ricegrass plants were found in 1999. Native forbs are rare, except for a *Cryptantha spp*. and a few annual mustards.

1994 TREND ASSESSMENT

Ground cover characteristics are similar to those of 1988, with the exception of litter cover which has declined. This is primarily the result of diminishing chaining debris. Percent bare ground has remained fairly

stable, although increasing slightly. Soil trend is still considered stable. The browse trend is down slightly due to the lack of seedlings and the large decline in young plants. This trend will most likely be reversed when normal precipitation patterns return. Trend for herbaceous plants is slightly down due to a decline in the sum of nested frequencies for grasses and forbs.

TREND ASSESSMENT
soil - stable
browse - slightly down, very little recruitment
herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is stable due to similar ground cover characteristics compared to those of 1994. Trend for browse is stable with respect to sagebrush. Density of all sagebrush species combined has remained similar to 1994 estimates. Seedlings and young plants are still limited, but at slightly higher levels compared to 1994. It appears that the basin big sagebrush are not doing as well as the black and Wyoming big sagebrush. Nearly 1/3 of the basin big sagebrush sampled display poor vigor and percent decadence has increased from 10% in 1994 to 32% currently. Rubber rabbitbrush is also showing signs of decline. It's population density has declined 36%, with 34% of the population displaying poor vigor, and percent decadence increase from 11% to 54%. No seedlings have been found on the site since 1988 and the proportion of young plants has steadily declined from 90% in 1988, to 22% in 1994, and only 9% by 1999. Released pinyon and juniper trees appear to be increasing in size. They provided 52% of the browse cover in 1994 and 61% in 1999. Taking all of these factors into consideration, trend for browse is considered stable since the key species, Wyoming big sagebrush, appears to have a stable population, the one that is best adapted to the drought conditions. Use is heavier than in 1994, but vigor has improved slightly, young recruitment has improved, and percent decadence has remained similar (23% vs 21%). This trend will change for the worse as the pinyon and juniper trees increase in size and density. Trend for the herbaceous understory is up slightly for perennial grasses but down for forbs. Overall the herbaceous understory is poor with grasses and forbs producing only about 6% cover in 1994 and 1999. Crested wheatgrass is the dominant species. It currently provides 92% of the grass cover and 84% of the herbaceous cover. It declined significantly in nested frequency between 1988 and 1994, but it has increased significantly since 1994. Forbs are rare and provide less than ½ of 1% cover. Trend is considered up slightly.

TREND ASSESSMENT
soil - stable
browse - stable
herbaceous understory - up slightly but poor

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 15

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	$_{b}$246	$_{a}$186	$_{b}$233	85	77	83	5.15	4.95
G	Agropyron intermedium	6	2	-	3	1	-	.00	-
G	Bromus inermis	4	-	-	3	-	-	-	-
G	Elymus junceus	$_{b}$35	$_{a}$9	$_{a}$11	16	3	6	.18	.42
G	Oryzopsis hymenoides	7	5	3	3	2	1	.04	.01
G	Poa fendleriana	-	1	-	-	1	-	.00	-
G	Sitanion hystrix	$_{b}$28	$_{a}$-	$_{a}$-	12	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		326	203	247	122	84	90	5.39	5.39
Total for Grasses		326	203	247	122	84	90	5.39	5.39
F	Arabis spp.	15	4	1	6	2	1	.01	.00
F	Chenopodium album (a)	-	$_{b}$7	$_{a}$-	-	3	-	.01	-
F	Cirsium spp.	1	-	-	1	-	-	-	-
F	Cryptantha spp.	$_{b}$100	$_{ab}$67	$_{a}$36	45	31	19	.58	.32
F	Descurainia pinnata (a)	-	$_{b}$21	$_{a}$-	-	10	-	.05	-
F	Draba spp. (a)	-	1	-	-	1	-	.00	-
F	Eriogonum umbellatum	16	18	8	9	8	3	.04	.04
F	Medicago sativa	3	-	-	2	-	-	-	-
F	Penstemon spp.	18	9	12	9	7	6	.03	.05
F	Ranunculus testiculatus (a)	-	-	1	-	-	1	-	.00
F	Salsola iberica (a)	-	$_{b}$23	$_{a}$-	-	9	-	.09	-
F	Schoencrambe linifolia	$_{b}$16	$_{ab}$13	$_{a}$5	11	6	3	.05	.01
F	Streptanthus cordatus	-	-	2	-	-	1	-	.00
F	Taraxacum officinale	2	-	-	1	-	-	-	-
F	Townsendia incana	2	-	-	2	-	-	-	-
F	Unknown forb-perennial	4	-	-	3	-	-	-	-
Total for Annual Forbs		0	52	1	0	23	1	0.16	0.00
Total for Perennial Forbs		177	111	64	89	54	33	0.72	0.44
Total for Forbs		177	163	65	89	77	34	0.89	0.44

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 16C, Study no: 15

Type	Species	Strip Frequency '94	Strip Frequency '99	Average Cover % '94	Average Cover % '99
B	Artemisia nova	16	10	.45	.18
B	Artemisia tridentata tridentata	10	16	.85	.75
B	Artemisia tridentata wyomingensis	39	34	2.58	2.59
B	Atriplex canescens	1	0	-	-
B	Cercocarpus montanus	2	2	-	-
B	Chrysothamnus nauseosus	-	-	-	.74
B	Chrysothamnus nauseosus albicaulis	37	28	1.36	1.12
B	Juniperus osteosperma	0	24	2.03	3.29
B	Opuntia spp.	2	0	-	-
B	Pinus edulis	0	8	3.84	5.18
B	Pinus edulis chained	0	0	-	-
B	Purshia tridentata	0	0	-	-
Total for Browse		107	122	11.14	13.88

CANOPY COVER --
Herd unit 16C, Study no: 15

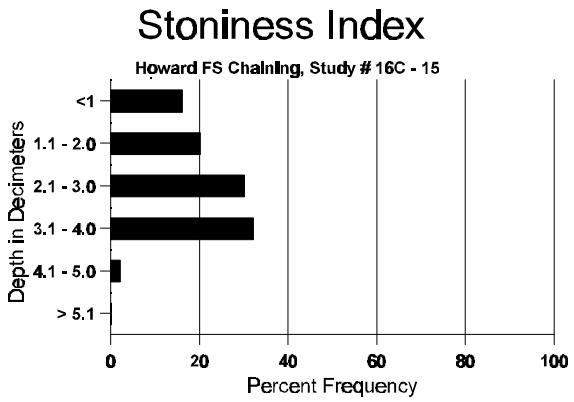
Species	Percent Cover '99
Juniperus osteosperma	2
Pinus edulis	5

BASIC COVER --
Herd unit 16C, Study no: 15

Cover Type	Nested Frequency '94	Nested Frequency '99	Average Cover % '88	Average Cover % '94	Average Cover % '99
Vegetation	253	254	3.25	17.63	18.36
Rock	256	184	12.25	10.96	8.97
Pavement	304	276	4.00	2.89	7.18
Litter	343	379	52.50	29.82	36.51
Cryptogams	10	41	0	.03	.81
Bare Ground	301	301	28.00	29.45	30.02

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 15, Study Name: Howard FS Chaining

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.0	55.6 (13.9)	7.6	54.7	23.4	21.8	5.1	6.3	80.0	0.8



PELLET GROUP DATA --
Herd unit 16C, Study no: 15

Type	Quadrat Frequency '94	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Sheep	-	3	12 (30)
Rabbit	11	53	n/a
Elk	4	5	1 (2)
Deer	62	51	42 (104)
Cattle	1	5	15 (37)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 15

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	14	1
	94	15	20	6	-	-	-	-	-	-	41	-	-	-	820	8	20	41
	99	1	13	5	-	-	2	-	-	-	21	-	-	-	420	6	16	21
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	4	4	2	-	-	-	-	-	-	8	-	-	2	200			10
	99	-	3	-	-	1	-	-	-	-	4	-	-	-	80			4
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	+94%
'94	47%	16%	04%	-47%
'99	63%	26%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'88	66	Dec:	0%
'94	1020		20%
'99	540		15%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata tridentata																		
S	88	20	-	1	-	-	-	7	-	-	28	-	-	-	1866			28
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	44	12	-	3	-	-	8	-	-	67	-	-	-	4466			67
	94	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	88	3	2	2	-	-	-	-	-	-	4	-	3	-	466	30	28	7
	94	5	2	-	-	-	-	-	-	-	7	-	-	-	140	41	46	7
	99	2	5	1	2	-	-	-	-	-	10	-	-	-	200	31	34	10
D	88	1	1	1	-	-	-	-	-	-	2	-	1	-	200			3
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	5	1	-	1	-	-	-	-	-	1	-	-	6	140			7
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	19%	04%	05%	-96%
'94	20%	00%	00%	+55%
'99	27%	05%	27%	

Total Plants/Acre (excluding Dead & Seedlings)				
'88	5132	Dec:		4%
'94	200			10%
'99	440			32%

Artemisia tridentata wyomingensis																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	7	2	-	-	-	-	-	-	-	9	-	-	-	180			9
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	34	14	-	1	-	-	-	-	-	47	-	-	2	980	21	25	49
	99	18	29	8	2	-	2	-	-	-	58	1	-	-	1180	17	24	59
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	10	2	2	1	-	-	-	-	-	3	-	-	12	300			15
	99	4	6	4	-	1	2	1	-	-	9	-	1	8	360			18
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	260			13
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	
'94	25%	03%	22%	+24%
'99	44%	19%	10%	

Total Plants/Acre (excluding Dead & Seedlings)			
'88	0	Dec:	0%
'94	1300		23%
'99	1720		21%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex canescens																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	30	29	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	25	18	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	0	Dec:	-
	'94	20		-
	'99	0		-

Cercocarpus montanus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	19	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	1	1	-	-	-	1	-	-	1	40			2
	99	-	1	-	-	1	-	-	-	-	-	-	-	2	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	
'94	50%	50%	50%	+ 0%
'99	100%	00%	100%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	0	Dec:	0%
	'94	40		100%
	'99	40		100%

Chrysothamnus nauseosus albicaulis																		
S	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	15	11	1	-	-	-	-	-	-	25	-	1	1	1800			27
	94	9	1	1	1	-	-	-	-	-	12	-	-	-	240			12
	99	2	-	-	-	-	1	-	-	-	2	-	-	1	60			3
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	29	21	1
	94	34	1	1	1	-	-	-	-	-	37	-	-	-	740	23	25	37
	99	1	3	3	-	4	2	-	-	-	11	1	1	-	260	37	36	13
D	88	1	-	1	-	-	-	-	-	-	2	-	-	-	133			2
	94	4	1	1	-	-	-	-	-	-	5	-	-	1	120			6
	99	1	7	2	1	-	6	2	-	-	9	-	-	10	380			19
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	37%	07%	07%	-45%
'94	05%	05%	02%	-36%
'99	40%	40%	34%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	1999	Dec:	7%
	'94	1100		11%
	'99	700		54%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
Y	88	13	-	-	1	-	-	-	-	-	11	-	3	-	933			14
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	21	-	-	-	-	-	-	-	-	19	-	1	1	420			21
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	6	-	-	-	-	-	-	-	-	5	-	1	-	120	-	-	6
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'88	00%	00%	21%
'94	00%	00%	00%
'99	00%	00%	11%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	933	Dec:	-
	'94	0		-
	'99	540		-

Opuntia spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	3	12	4
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'88	00%	00%	00%
'94	00%	00%	00%
'99	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	0	Dec:	-
	'94	80		-
	'99	0		-

Pinus edulis																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140	-	-	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'88	00%	00%	00%
'94	00%	00%	00%
'99	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	200	Dec:	-
	'94	0		-
	'99	160		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis chained																		
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'88	00%	00%	00%
'94	00%	00%	00%
'99	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'88	66	Dec:		100%
'94	0			0%
'99	0			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16	32	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'88	00%	00%	00%
'94	00%	00%	00%
'99	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'88	0	Dec:		-
'94	0			-
'99	0			-